WORKING PROCEDURE

WP 009A

Title	Page Number
PNGV Horiba Emission Analysis System Tracer Gas Injection	1 of 17
Originator	**Supersedes**
Stephen Pfeiffer	WP 009
Responsible Organization	**Computer Program**
Partnership For a New Generation Vehicle (PNGV)	Power Tech, Horiba and Excel
Type of Test Report	**Data Form Number**
Propane Processor Excel Spreadsheet	N/A
Report Distribution	**Implementation Date**
Site Propane Calibration Folder	3-14-2000

Implementation Approval

Original Test Procedure Authorized by EPCN #247 on 02-21-2000

Revision Description

(1) 03-14-2000 The purpose of this change is to revise the procedure as described in EPCN #277. All steps affected by this change are identified with (1) in the margin.

Note: Specific brand names in this procedure are for reference only and are not an endorsement of that product.

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Figures

1. Purpose

The purpose of this working procedure is to describe the equipment and steps required to perform a Propane Injection Procedure on the Horiba Emission Analysis System, Series 7200, using a Critical Flow Orifice (CFO) kit.

2. Test Procedure

101 Turn on the test site air handling system and wait a minimum of 15 minutes for the site temperature to stabilize.

102 Place a CFO kit with a valid calibration sticker in the test cell and allow the kit temperature to stabilize for a minimum of 20 minutes.

103 In the test cell:

remove the cover of the cleanout port and insert the kit rosette in the cleanout port at the bottom of the tunnel assembly

or disconnect the exhaust pipe and place the kit rosette in the exhaust pipe.

104 In the control room, ensure that the Power Tech computer is powered up and VXIN is turned on according to the VXIN startup procedure.

105 On the Power Tech computer, select “CVS Blower” from the soft panel at the bottom of the screen. See the arrow in Figure 1.

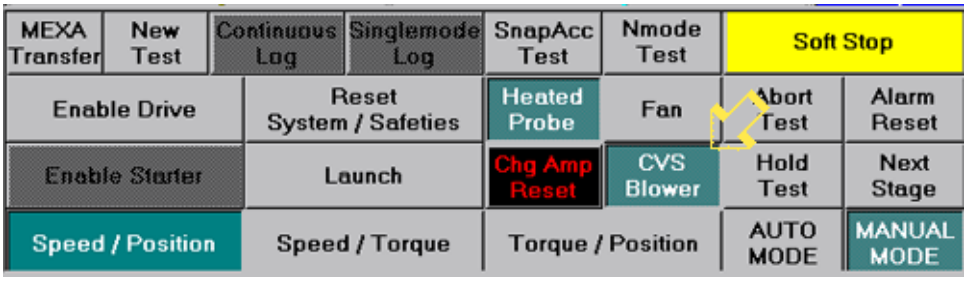


Figure 1
CVS Blower Screen

(1) 106 On the Power Tech computer secondary display screen Heated Probes subpanel, select “Dilute” to turn on the heated probe. See the arrow in Figure 2.

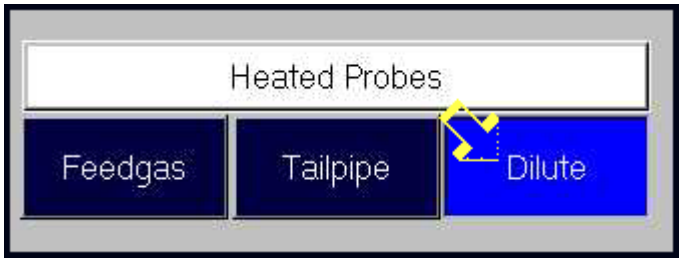


Figure 2
Heated Probe On

107 Ensure the Horiba Emission Analysis System is powered up according to the Horiba startup procedure and that the Horiba computer command screen is displayed.

108 On the Horiba computer command screen, select the “THC” button for the MEXA analyzer. See the arrow in Figure 3. Select “Cal” from the menu displayed. See the circle in Figure 3. An automatic zero span calibration procedure will begin (green=zero, blue=span).

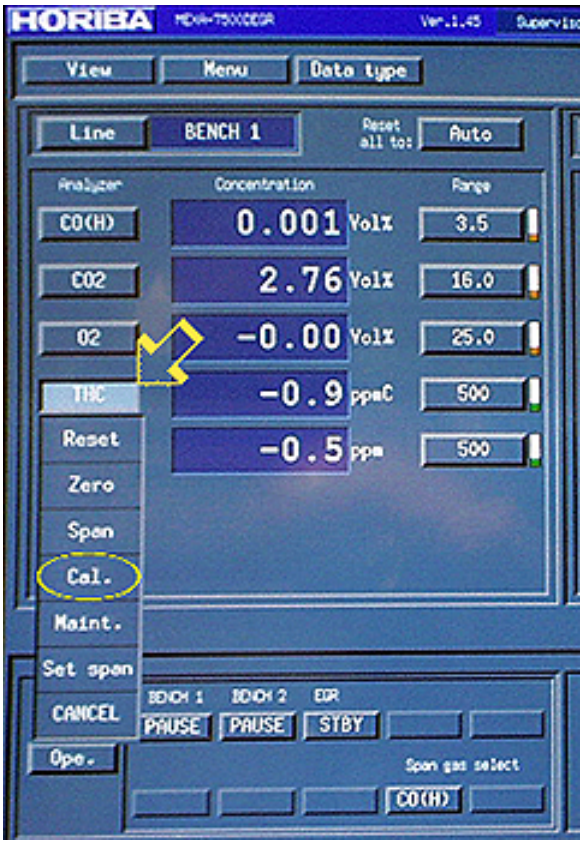


Figure 3
Cal Selection Screen

109 Ensure that the test processing computer is powered on.

Open the Excel program.

From the file menu, select Open, C:/calibration/propanes.xls.

110 Select “Propane2,YY.MM.DD.dil.xls” from the list of files.

See the highlighted file name in Figure 4.

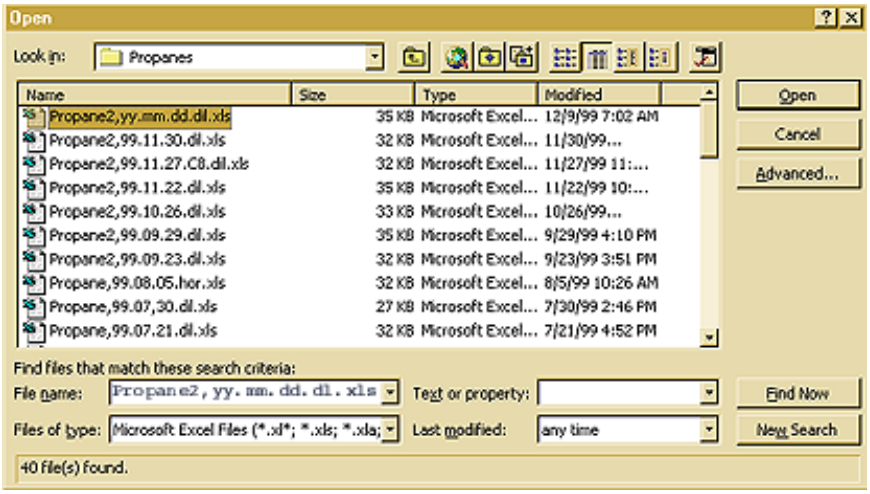


Figure 4
Open File Screen

111 On the “PROPANE PROCESSOR Input Data” screen, select each yellow field type listed underneath the categories listed below and use the keyboard to enter the appropriate information:

Test Date, see the arrow labeled A in Figure 5

Test Time, see the arrow labeled B in Figure 5

Operator ID, see the arrow labeled C in Figure 5

CVS ID, see the arrow labeled D in Figure 5

CFO Property ID, see the arrow labeled E in Figure 5

Analyzer (PRE CAT, POST CAT, DILUTE), see the arrow labeled F in Figure 5

	1	2	3	4	5	6	7	8
1				PROPANE PROCESSOR				Processed: 01/12/00 10:11
2				Input Data				
3								
4	A	B		Test Identification				C
5	Test	Test		Ambient Conditions				Operator
6	Date	Time			Baro Pressure			ID
7	11/30/99	2:30			29.7	"Hg		42137
8								
9	D			CVS Data				
10	CVS	CVS						
11	ID	Flow Reading						
12	Horiba CVS	749.5	SCFM					
13								
14				Gas Data				
15	E	CFO			F	Analyzer		
16	Property ID	Temp (F)	Gauge Press		Analyzer	Bkgd Reading	Sample Reading	
17	38625	74.8	90		A301 Bench1	4.1	128.5	ppmC
18								

Figure 5
Propane Processor Input Data

112 On the "PROPANE PROCESSOR Input Data" screen, check the "CFO Calibration Coefficients" in column 5, rows 105, 106, and 107 against the current coefficients listed on the CFO kit. If they are the same, proceed to the next Step. If they are not the same, change the screen coefficients to those listed on the CFO kit. See the circle in Figure 6.

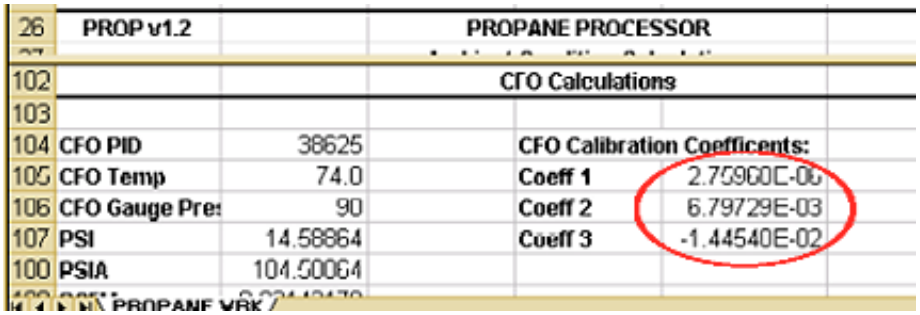


Figure 6
CFO Calibration Coefficients

113 Check barometer in Large Soak, return to the computer and enter the data in the yellow field under "Baro Pressure" on the "PROPANE PROCESSOR Input Data" screen. See the arrow in Figure 7.

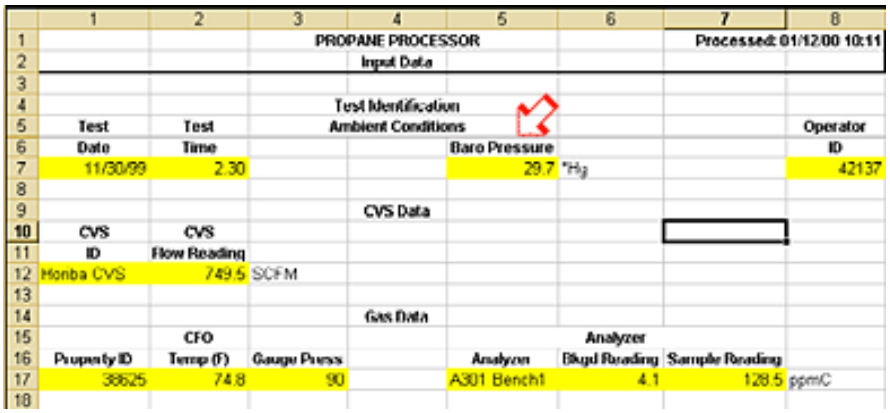


Figure 7
Barometer Pressure Input Data

114 On the Power Tech computer, select “Menu” at the top of the screen. Select “Upper Display” from the menu that appears. Select “TGI” from the next menu.

115 On the Power Tech computer select “Mexa Transfer” in the soft panel at the bottom of the screen. See the arrow in Figure 8.

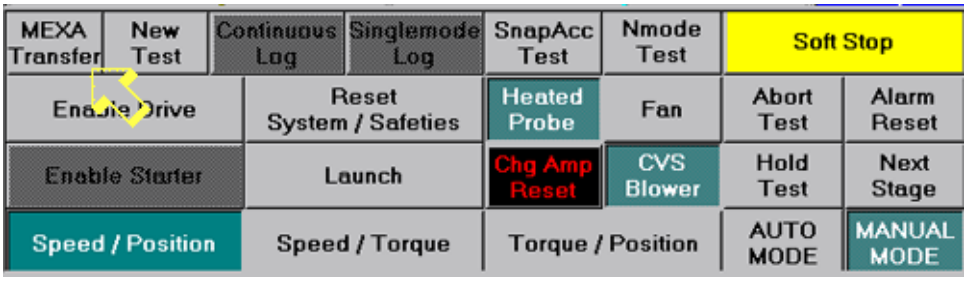
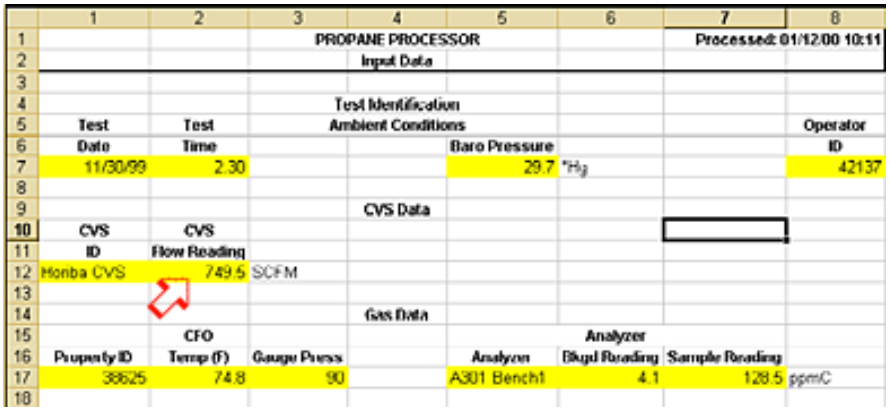


Figure 8
Mexa Transfer Screen

116 On the Power Tech computer, check the CVS flow reading in the field next to “qvEpacvsBoxcar” See the arrow in figure 9. The data will be used in the next step.

Figure 9
qvEpacvsBoxcar

117 On the test processing computer “PROPANE PROCESSOR Input Data” screen in the yellow field under “Flow Reading, enter the data from Step 116. See the arrow in Figure 10.



	1	2	3	4	5	6	7	8
1				PROPANE PROCESSOR			Processed: 01/12/00 10:11	
2				Input Data				
3								
4				Test Identification				
5	Test	Test		Ambient Conditions				Operator
6	Date	Time			Baro Pressure			ID
7	11/30/99	2.30			29.7	"Hg		42137
8								
9				CVS Data				
10	CVS	CVS						
11	ID	Flow Reading						
12	Honba CVS	749.5	SCFM					
13								
14				Gas Data				
15		CFO				Analyzer		
16	Property ID	Temp (F)	Gauge Press		Analyzer	Bkgd Reading	Sample Reading	
17	38625	74.8	90		A301 Bench1	4.1	128.5	ppmC
18								

Figure 10
Flow Reading Input Data

118 Select the “Ope.” button under “Line” in the lower left corner of the Horiba Main Control Unit (MCU). See the arrow in Figure 11. The line selector panel will appear. Select the button below the line for the bench under test. From the next menu, select the line for dilute measurement.

Figure 11
Ope Selection Screen

119 Select the “Sample” button under “Line” in the lower left corner of the Horiba MCU. See the arrow in Figure 12.

Figure 12
Select Sample Screen

“Ope.” will return under “Line”

120 In the lower left corner of the Horiba MCU, select “Standby”. See the arrow in Figure 13. Select “Measure” from the menu panel that appears. See the circle in Figure 13.

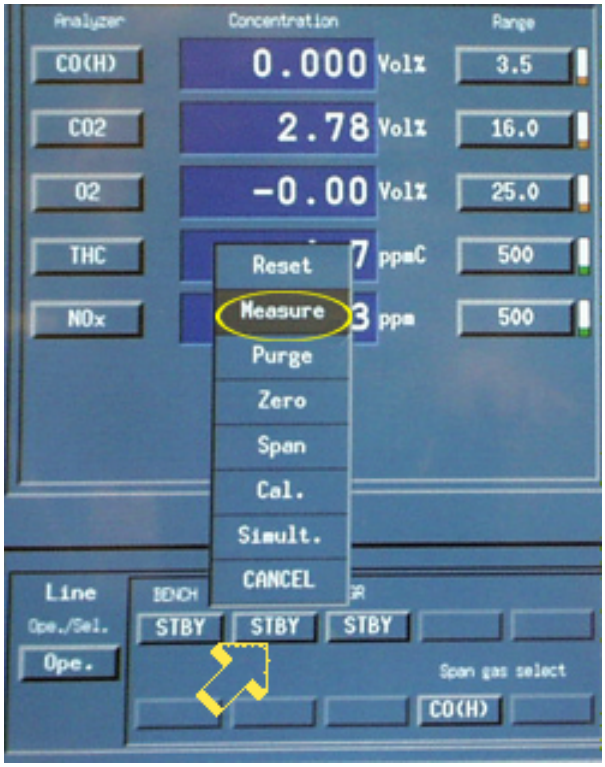


Figure 13
Measure Screen

121 On the Power Tech computer, check the background reading in the field next to ""conHC" field See the circle in Figure 14. The data will be used in the step 123.

Figure 14
conHC Screen

122 In the lower left corner of the Horiba MCU screen, select the "Standby" button. See the arrow in Figure 15. Select "Reset" from the menu that appears. See the circle in Figure 15. The sample pump will shut off.

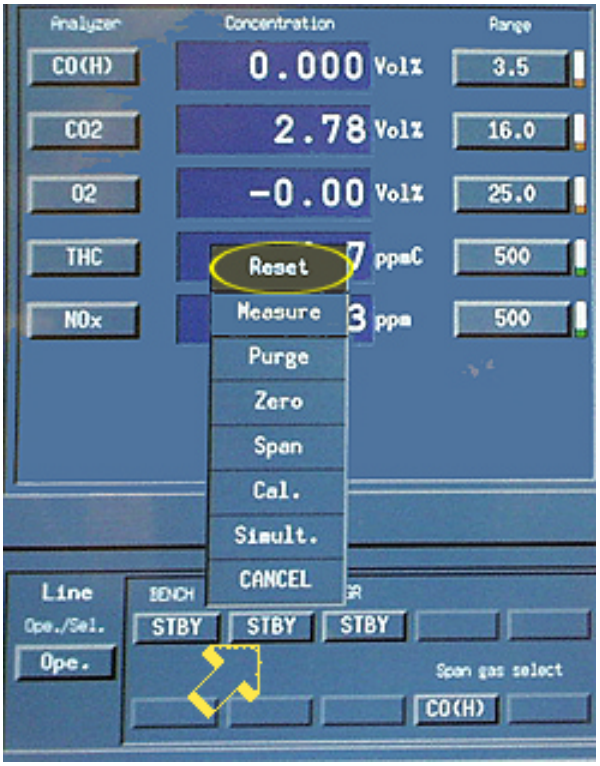


Figure 15
Reset Screen

123 On the test processing computer “PROPANE PROCESSOR Input Data” screen in the yellow field under “Bkgd Reading”, enter the data from Step 121. See the circle in Figure 16.

Analyzer			
Analyzer	Bkgd Reading	Sample Reading	
A301 Bench1	4.1	128.5	ppmC

Figure 16
Bkgd Reading Input Data

124 Return to the test cell and open the valve on the propane tank. Use the regulator on top of the bottle to adjust the pressure to 90 ±5 PSI. See Figure 17. Allow a minimum of 10 minutes for stabilization.

Figure 17
Propane Tank

125 In the lower left corner of the Horiba MCU, select "Standby." See the arrow in Figure 18. Select "Measure" from the menu panel. See the circle in Figure 18.

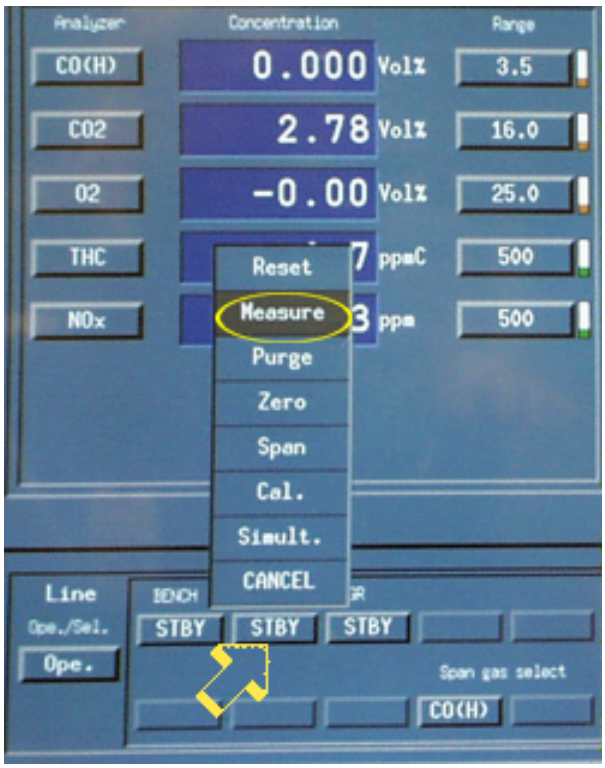


Figure 18
Measure Selection Screen

126 Return to the test cell and take the pressure and temperature reading from the CFO kit. See the arrows in Figure 19. The data will be used in Step 127.

Figure 19
Critical Flow Orifice Kit

127 On the test processing computer "PROPANE PROCESSOR Input Data" screen in the yellow cells below "CFO Temp (F)" and "Gauge Press", enter the temperature and pressure data from Step 126. See the circle in Figure 20.

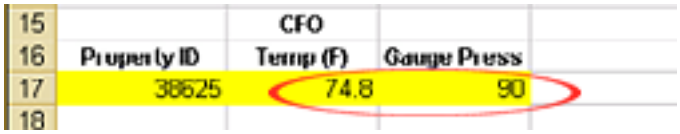


Figure 20
CFO Temp & Gauge Press Input Data

128 On the Power Tech computer, check the sample reading in the field next to “”conHC” field. See the circle in Figure 21.

Figure 21
conHC Sample Reading Screen

129 On the test processing computer “PROPANE PROCESSOR Input Data” screen in the yellow field under “Sample Reading”, enter the data from the Step 128. See the circle in Figure 22.

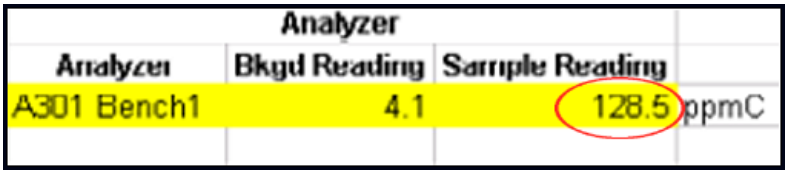


Figure 22
Sample Reading Input Data

130 On the test processing computer keyboard, press <Enter>. The Excel spreadsheet program will automatically calculate and display the results in the form of percent-of-error below the "Error" cell.

Verify that the result under "Error" is equal to or less than ±2%. See the circle in Figure 23. If it is, proceed to the next step.

If the error is greater than ±2.0%, contact a senior technician for further instructions.

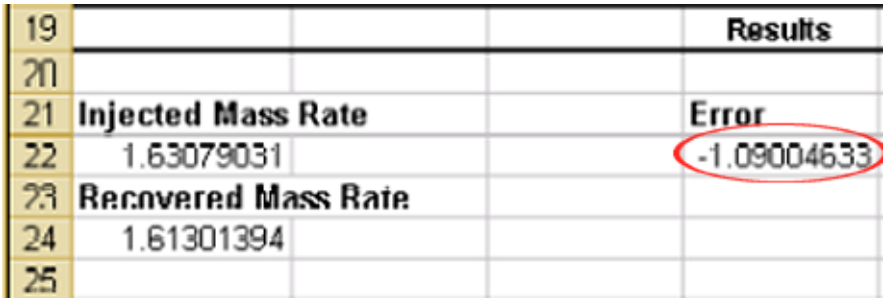


Figure 23
Percent of Error Display

131 Select "File" on the test processing computer screen, then select "Print" from the menu displayed. Select "Print" in the printer dialog box.

132 Place the printout in the site Propane Calibration folder.

133 Select "File" on the test processing computer screen, then select "Save as" from the menu displayed. In the "Save as" dialog box, select the file name "Propane2.yy.mm.dd.dil.xls" which will then appear in the file name box at the bottom of the dialog box.

134 Edit the file name by using the keyboard to enter the year, month and date of the test in the yy.mm.dd format. Use the mouse to select the "Save "button.

135 Select "File" on the test processing computer screen, then select "Exit" from the menu displayed. When the dialog box, "Do you want to save the changes you made to Propane2.yy.mm.dd.dil.xls?" appears, select the "No" button.

136 On the test processing computer, close remaining screens until the standard desktop remains. If further tests are not scheduled, shut down the computer.

137 Return to the test cell and close the valve on the propane tank.

138 Select “Displays” from the top portion of the Power Tech computer screen and select “Upper displays” from the menu. Select “EPAX_TDD” from the next menu.

139 Return to the test cell and ensure that the CFO kit pressure has fallen to zero.

140 In the control room, on the soft panel portion of the Power Tech computer screen select “CVS Blower” to turn it off. Select “Heated Probe” to turn it off. If further tests are not scheduled, perform the VXIN shutdown procedure.

(1) 141 On the Power Tech computer Heated Probes subpanel, select “Dilute” to turn off the heated probe. See the arrow in Figure 24. If further tests are not scheduled, perform the VXIN shutdown procedure.

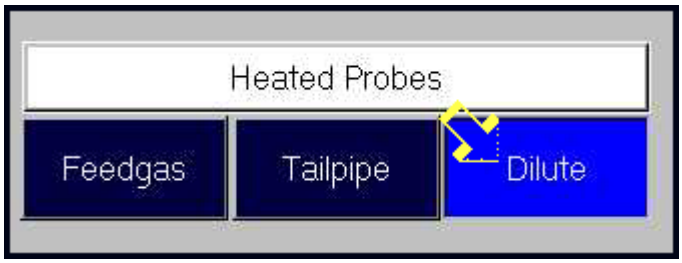


Figure 24
Heated Probe Off

142 If further tests are not scheduled, turn off the air handling.

143 Return the CFO kit to the appropriate storage area.

3. Acceptance Criteria

3.1 Allow the test site temperature to stabilize for a minimum of 15 minutes before starting the procedure.

3.2 The propane kit used must have a valid calibration sticker.

3.3 Allow the propane kit temperature to stabilize for a minimum of 20 minutes after it has been moved into the test site.

3.4 Allow a minimum of 10 minutes for the propane tank to stabilize after opening the valve and adjusting the pressure to 90 ±5 PSI

3.5 The percent of error must be equal to or less than ±2.0% (displayed under “Results” on the “Propane Processor” data screen).